MIDTERM SOLUTION

FIRST TERM

2015-2016

1-Discuss interactive, batch, uni-programming, multi-programming OS

- Interactive (*Real time):-real time consist all that time which is required to the execution of the programs. Real time is of two types that is hard time and soft time.*
- *BATCH SYSTEM:-In batch processing user can execute programs in batch form . each batch contains similar type of programs. batches are made by server and execute by operating system*
- *MULTI PROGRAMMING SYSTEM:-the operating system keeps several programs in memory simultaneously. it increases CPU utilization by organizing job so that the CPU always has one to executed.*

The characteristics of uniprogramming are as follows:

- Uni programming allows only one program to be present in memory at a time.

- The resources are provided to the single program that is present in the memory at that time.

- Since only one program is loaded the size is small as well.

Characteristics of multiprogramming:

- Multiple programs can be present in the memory at a given time.

- The resources are dynamically allocated.

- The size of the memory is larger comparatively.

2-Discuss the scheduling types: FCFS and time sharing

First Come First Serve (FCFS)

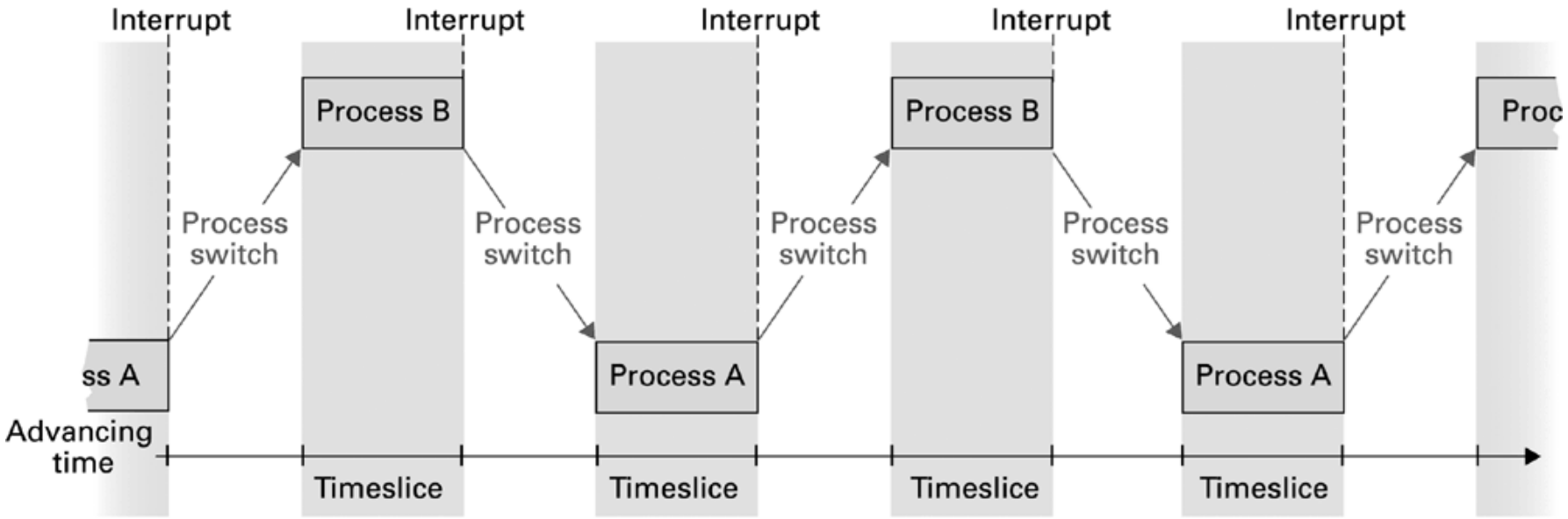
- Jobs are executed on first come, first serve basis.
- Easy to understand and implement.
- Poor in performance as average wait time is high.

2-Discuss the scheduling types: FCFS and time sharing

Time sharing (Round Robin) Scheduling:

- Each process is provided a fix time to execute called time slot or quantum.
- Once a process is executed for given time period. Process is preempted and other process executes for given time period.
- Context switching is used to save states of preempted processes.

2-Discuss the scheduling types: FCFS and time sharing



3-Compare the priority interrupt and vector interrupt?

- In a computer, a vectored interrupt is an I/O interrupt that tells the part of the computer that handles I/O interrupts at the hardware level that a request for attention from an I/O device has been received and and also identifies the device that sent the request.
- A vectored interrupt is an alternative to a polled interrupt , which requires that the interrupt handler poll or send a signal to each device in turn in order to find out which one sent the interrupt request.

- Priority interrupt
- Assigning different priorities to interrupt requests can be useful in trying to balance system : some kinds of interrupts need to be responded to more quickly than others, but the amount of processing might not be large, so it makes sense to assign a higher priority to that kind of interrupt.

4- what is the effect of swapping size on data handling rate ?

- Swapping is a memory management scheme by which a computer stores and retrieves data from secondary storage for use in main memory in same-size blocks called *pages*.
- When a program tries to reference a page not currently present in RAM, the processor treats this invalid memory reference as a page fault

4- what is the effect of swapping size on data handling rate ?

- When the swapping size is a small percentage of the system's total number of pages, virtual memory systems work most efficiently and an insignificant amount of computing is spent resolving page faults.
- As the swapping size grows, resolving page faults remains manageable until the growth reaches a critical point. Then faults go up dramatically and the time spent resolving them overwhelms time spent on the computing the program was written to do. This condition is referred to as thrashing. Satisfying page faults may require freeing pages that will soon have to be re-read from disk

5- which you prefer fixed or dynamic partitioned memory ? The advantage

- **Fixed Partitioning** - Split the physical memory into partitions into each a process may be assigned.
  - Two difficulties:
  - The programmer may have to rewrite a program in order to fit into even the largest available partition.
  - **Internal fragmentation** typically results--there's memory that is unused within each partition.
- **Dynamic Partitioning**
  - Dynamic parititioning has the OS allocate the space for a process when it enters the system.
  - **External fragmentation** occurs here.

7-- Define action to defining the printer to a computer?

- An interrupt is caused when the printer is connected to a computer. This interrupt is assigned one of IRQ values (interrupt request). A unique value must be specified for each device and its path to the computer.

8-What is the effect of bootstrap process?

- **Bootstrap:** Program in ROM (example of firmware)
  - Run by the CPU when power is turned on (PC starts at pre-defined address when power is applied)
  - Transfers operating system from mass storage to main memory
  - Executes jump to operating system

9-Discuss the processes of OS?

- NEW:-The process is being created.
- *RUNNING:-Instruction are being executed.*
- *Waiting:-The process is waiting for some event to occur.*
- *READY:-The process is waiting is to be assigned to a processor.*
- *TERMINATED:-The process has finished executions.*
- *As a process executed , it changes state. The state of a process is defined in part by the current activity of that process.*

10- the next jobs arrived at time shown , and to be processed using time sharing, find mean completion time, mean waiting time, assuming slot time = 10 time units

Job no.	1	2	3	4	5	6	7	8	9	10
Arrival (request) time	2	4	5	6	7	9	11	12	18	23
Expected service time	10	12	20	12	13	2	18	10	8	20

b no.	1	2	3	4	5	6	7	8	9	10
pected rt time	2	12,92	22,94	32,104	42,106	52	54,109	64	74	82,117
pected mpletion ne	12#	22,94#	32,104 #	42,106#	52,109 #	54#	64,117#	74#	82#	92,127#
pected iting ne	0	8,(92-22)=70	17,(94-32)=62	26,(104-42)=62	35,(106 -52)=54	43	43,(109 -64)=45	52	56	59,(117-92)=25

Average completion time $= \frac{(12+94+104+106+109+54+117+74+82+127)}{10} = 87.9$

, average waiting time $= \frac{(8+70+17+62+26+62+35+54+43+43+45+52+56+59+25)}{10} = 65.7$